PATENT SPECIFICATION

263,458

Application Date: Sept. 23, 1926. No. 23,490/26.

Complete Left: Oct. 22, 1926.

Complete Accepted: Dec. 30, 1926.

PROVISIONAL SPECIFICATION.

Improvements in Anti-friction Bearings.

We, THE AUTO MACHINERY COMPANY LIMITED, a British company, and BERNARD LEEDHAM, a British subject, both of Hood Street, Coventry, Warwickshire, do hereby declare the nature of this invention to be as follows:—

This invention relates to anti-friction bearings, and it has for its object to provide a narrow bearing of high load-carrying capacity which can be employed to take both thrust and journal load (or either), and yet be suitable for high speeds of rotation.

According to this invention, a plurality of rows of balls of decreasing size and decreasing pitch circles are used in parallel tracks on a single inner and a single outer race.

In one construction, there is an inner race having two ball grooves on its outer periphery and so close together that the balls in one groove lie partly between the balls in the other groove. This is not necessary, but it enables the complete race to be made very narrow.

The one groove is slightly larger in diameter than the other, and this groove receives slightly larger balls than those that run on the smaller one. There may be a separate cage for each series of balls, or a single cage engaging both rows, or one or both rows may be cageless.

The outer race is formed with two grooves of different internal diameters, and is sprung or clicked on to the rows of balls in the well-known manner.

Preferably the pitch circles of the balls lie on the frustum of a cone whose apex lies on the axis of the bearing, whilst the outer and inner races are also on the surfaces of cones having the above apex.

By this means the complete bearing can be very narrow and can be made within very fine limits as regards width. Both rows of balls are suitable for taking end thrust as well as journal load, and the complete bearing can be used at high rotational speeds. Furthermore, when the complete bearing is assembled it is a complete unit which can be of standard over-all dimensions, and the outer race cannot become disconnected.

If desired, either the outer, or the inner, race may be plain and not grooved, but in such a construction the plain surface would be part of a cone having its apex on the axis of the bearing.

The bearing may, however, have a loose outer ring carrying the outer tracks, which ring may be adjustable in relation to the inner ring, to take up wear.

Obviously, more than two rows of balls may be employed in the manner described.

Dated this 22nd day of September, 1926.

ERIC W. WALFORD,
Fellow of the Chartered Institute of Patent Agents,
19, Hertford Street, Coventry,
Agent for the Applicants.

COMPLETE SPECIFICATION.

Improvements in Anti-friction Bearings.

We, THE AUTO MACHINERY COMPANY LIMITED, a British company, and BERNARD LEEDHAM, a British subject, both of Hood Street, Coventry, Warwickshire, do hereby declare the nature of this invention and in what manner the

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same is to be performed, to be particularly described and ascertained in and by the following statement:—

This invention relates to ball bearings of the kind having a plurality of rows of balls of decreasing size and decreasing pitch circles running on parallel tracks on a single inner and a single outer race. The object of the invention is to provide a construction of small width and high load-carrying capacity, which may be a unit interchangeable with existing ball, and taper roller, bearings.

According to this invention, the tracks are so close together that the balls in one groove lie partly between the balls in the adjacent groove. Preferably all the balls are engaged by a single cage or spacer.

Figure 1 is a longitudinal section of a complete bearing constructed in accordance with this invention.

Figure 2 is a cross section of the same.

Figures 3 and 4 are longitudinal sections on a larger scale of the two races, and

Figure 5 is a part section of an alternative outer race.

Like numerals indicate like parts throughout the drawings.

In the construction shown in Figures 1—4, there is an inner race 2 having two ball grooves 3 and 4 on its outer periphery and so close together that the balls in one groove lie partly between the balls in the other groove as is shown in Figure 1. This results in the bearing being very narrow in spite of its having two or more rows of balls and permits it to deal better with the loads to which it is subjected.

The groove 3 is slightly larger in diameter than the groove 4, and receives slightly larger balls 5 than those 6 that run on the smaller race 4. There is employed a single cage or spacer 7 of any suitable type engaging both rows, or one or both rows may be cageless. This feature again contributes towards the narrowness of the complete bearing.

The outer race 8 is formed with two grooves 9 and 10 of different internal diameters, and is sprung or clicked on to both the rows of balls or either row in the well-known manner. In the construction shown it would slide freely on to the row 6 and click on to the row 5 owing to the slight shoulder at 50.

To enable the balls always to retain a uniform relative position and a single cage or spacer to be used, the pitch circles of the balls lie on the frustum of a cone 100 whose apex 11 is on the axis 120 of the bearing, whilst the outer and inner grooves, or tracks, are also on the surfaces of cones 12 and 13 having the same apex. This ensures the required constant relative angular position of the balls of all the rows as the bearing is revolved.

By this means the complete bearing can be very narrow and can be made within very fine limits as regards width. Both rows of balls are suitable for taking end thrust as well as journal load, and the complete bearing can be used at high rotational speeds. Furthermore, when the complete bearing is assembled it is a complete unit which can be of standard over-all dimensions, and the outer race cannot become disconnected.

If desired, either the outer, or the inner, race may, however, be plain as shown at 80 in Figure 5 and not grooved, but in such a construction the plain surface would be part of a cone having its apex as described above.

Where the bearing has a loose outer ring carrying the outer tracks (i.e., a plain one such as 80, or a grooved one which does not click on to the balls), that ring may be adjustable in relation to the inner ring, to take up wear.

Obviously, more than two rows of balls may be employed in the maner described.

Having now particularly described and ascertained the nature of our said invention and in what manner the same is to be performed, we declare that what we claim is:—

1. A ball bearing of the kind referred to, in which the tracks are so close together that the balls in one groove lie partly between the balls in the adjacent groove, substantially as and for the purpose described.

2. A bearing as claimed in Claim 1, wherein all the balls are engaged by a single cage or spacer, substantially as and for the purpose described.

3. A bearing as claimed in Claim 1, wherein the inner race is grooved to form the inner ball tracks, and the outer race has a slight shoulder, such as 50, to one outer track only, so that that race cannot be accidentally disconnected, substantially as described.

4. The complete anti-friction bearing substantially as described or illustrated in the accompanying drawings.

Dated this 22nd day of October, 1926.

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Redhill: Printed for His Majesty's Stationery Office, by Love & Malcomson, Ltd.—1927.

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263,458 COMPLETE SPECIFICATION

1 SHEET

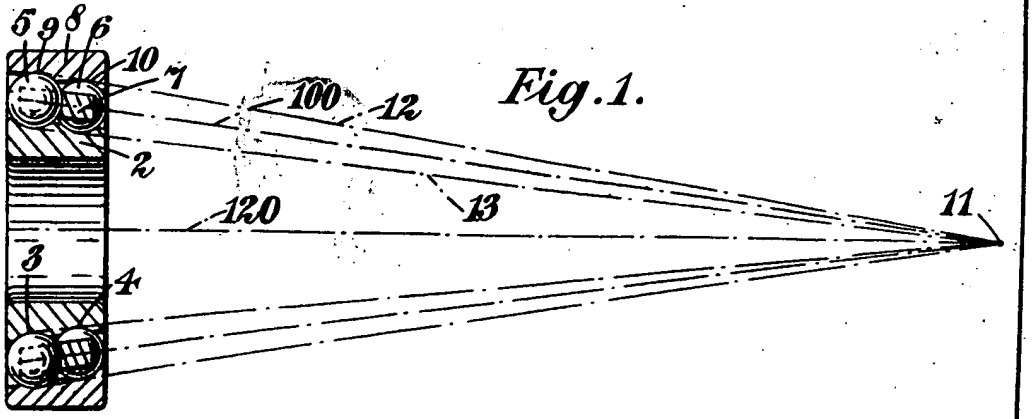

Fig. 1.

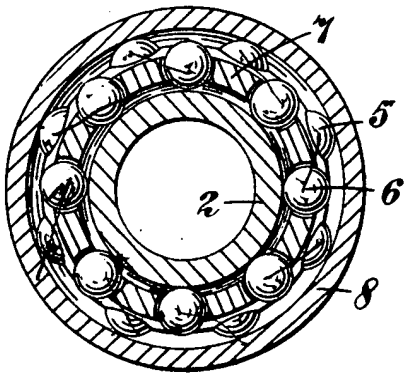

Fig. 2.

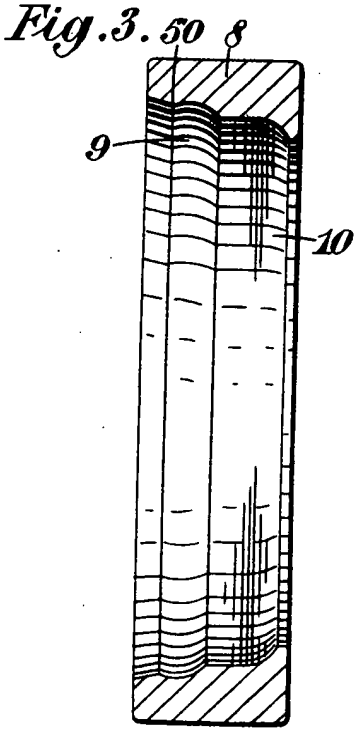

Fig. 3.

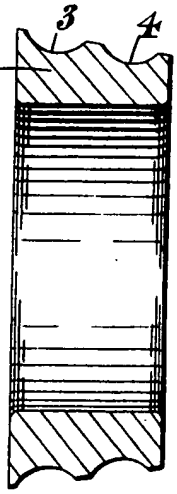

Fig. 4.

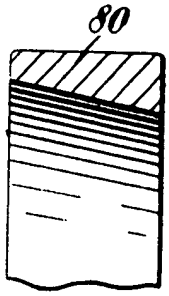

Fig. 5.

[This Drawing is a reproduction of the Original on a reduced scale]

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